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Increasing Influenza Vaccination Rates in a Primary Care Clinic: A Quality Improvement Study

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Spring 2018

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Abstract

Background

According to the most recent CDC statistics, the influenza virus kills between 12,000 and 56,000 people per year in the United States. Although influenza vaccination is recommended each year, only about half of all Americans are actually receiving the vaccine annually. The goal of this quality improvement project was to increase influenza vaccination rates at a large academic medical center in Kentucky. At baseline, there was no standardized screening protocol in place prior to this study.

Methods

This study implemented a pre-test post-test design to evaluate the impact of a process change intervention on vaccination status from September 1, 2017 to February 28, 2018. Participants for this study were taken from the list of all patients currently active at this clinic via the electronic medical record. This study was conducted in four phases, using the Plan Do Study Act (PDSA) improvement model as a guide. Focus groups were held with clinic staff to establish a process change for influenza vaccination. Chart audits were done monthly and changes were made based on feedback from clinic staff and vaccination rates.

Results

Starting vaccination rates at the clinic were 0.65% in October 2017. The first full month of entire clinic compliance with the standardized process was February 1, 2018 to February 28, 2018, with vaccination rates of 30.42%. This was a 29.77% increase in vaccination rates during the study and a 5.2% increase from the 2016-2017 influenza vaccination rates of 25%.

Conclusion

Through a team based practice improvement process, overall vaccination rates increased at this clinic. MACRA reimbursement requirements were achieved at this clinic due to this vaccination increase. Creating a standardized screening and vaccination protocol was feasible and effective in increasing vaccination rates within this clinic.

Background

The influenza virus is estimated to kill between 12,000-56,000 people each year in the United States (CDC, 2017). There are between 9.2 and 36 million cases of influenza in the U.S. each year, and between 140,000-710,000 influenza-related hospitalizations (CDC, 2017). Although exact numbers of influenza deaths, hospitalizations, and cases are difficult to obtain each year due to the mass numbers, comorbidities leading to influenza-associated deaths, and missed testing opportunities, the CDC (2018) uses mortality data obtained from the National Center for Health Statistics to estimate annual influenza death rates.

The burden of the influenza virus in the U.S. typically falls from the beginning of October through the end of March, with peak activity in December, January, and February (CDC, 2018). Influenza activity has been reported through the month of May in previous influenza seasons. Since the 2017-2018 influenza season is on track to be one of the worst according to the CDC, vaccination is crucial for prevention of falling ill with the influenza virus.

While there are other important ways to prevent the influenza virus such as handwashing and avoiding contact with those who are sick, the most effective strategy for preventing the virus is vaccination (CDC, 2017). The CDC recommends all people aged six months and older receive the influenza vaccination as the single best way to prevent illness (CDC, 2017). Those who cannot receive the influenza vaccine include those younger than six months and those who have life-threatening allergies to the vaccine. Vaccination is especially important in those at high risk for serious complications from the virus such as children, those who are pregnant or trying to become pregnant, those 65 and older, and people with underlying chronic conditions (CDC, 2017). The influenza virus can be deadly in these populations.

The influenza vaccination protects against three or four different strains of the virus, depending on the vaccination components. While the influenza vaccination has not been especially effective for the 2017-2018 influenza season, the CDC still stresses the importance of the influenza vaccine, as it has been shown to decrease the likelihood of hospitalizations and deaths from the virus (CDC, 2017). Rates of hospitalizations from the influenza virus are the highest on record since 2010, when the CDC began to track hospitalization rates related to influenza (CDC, 2017). Not only does receiving the influenza vaccine decrease chances of catching the virus, but it also has been shown to decrease severity and duration of symptoms (CDC, 2017). Decreasing the severity and duration of symptoms then leads to an overall decrease in hospitalizations and deaths from the virus.

Although the CDC recommends influenza vaccination each year, in the 2016 National Health Interview Survey, only 49.9% of those aged 6 months to 17 years, 31.8% of those aged 18-49, 45.2% of those aged 50-64, and 67.2% of those aged 65 and over reported receiving the vaccine in the past twelve months (Clarke, Norris, & Schiller, 2016). This totals to only 48.53% of all Americans receiving the influenza vaccination during the past year. Coverage of the spread of the influenza virus is rampant on most large news stations, as well as on social media. However, despite community knowledge of the rising hospitalizations and deaths from the influenza virus, as well as provider recommendation, vaccination rates continue to be low.

Local Problem

Kentucky ranks 9th in death rates for influenza and pneumonia in the United States, with a death rate of 19.3% (CDC, 2015). Influenza and pneumonia are tied as the 9th leading causes of death in Kentucky (CDC, 2015). For the 2017-2018 influenza season, Kentucky is included in

the widespread influenza activity currently taking place in the United States, with increasing cases, hospitalizations, and deaths on a daily basis (CDC, 2017).

Kentucky has a 42.6% total reported influenza vaccination rate, which falls below the national average of 48.5% (U.S. Department of Health and Human Services, 2018). Fayette County has a slightly higher vaccination rate of 54.76% (U.S. Department of Health and Human Services, 2018). Kentucky's low vaccination rates represent a disparity and are attributed to the previously mentioned barriers, in addition to access to care and affordability of care (CDC, 2017).

The clinic in which this study took place is one of seventeen family medicine clinics associated with this large academic center in Kentucky. Prior to initiation of this study, this clinic was not meeting MACRA reimbursement requirements for influenza vaccination administration. Vaccination rates at this clinic were 25% for the 2016-2017 influenza season. This low vaccination rate not only decreased the quality of care received in the clinic, but impacted the entire medical center financially. Without increased compliance for vaccination rates, this large academic center could lose up to four million dollars in 2019 from penalties from MACRA.

Barriers to Vaccination

This low vaccination rate can be attributed to a number of barriers such as a fear of side effects, moral or religious objections, limited access to care, and lack of knowledge about the vaccine (Ventola, 2016). According to a focus group with staff at this clinic, there are three main barriers to vaccination: lack of patient belief in the effectiveness of the vaccine, low staff enthusiasm about the vaccine, and patient misconceptions about the vaccine.

One of the most common barriers to being vaccinated is the misconception that one can catch the influenza virus from the influenza vaccine (Ventola, 2016). This is especially common among the young adult population. In a study of college students, Benjamin and Bahr (2016) found that nearly 50% of participants believed they would get influenza from receiving the vaccine. This barrier can be overcome through patient education regarding the difference between a potential immune response from the vaccine and actually being ill with the influenza virus (Ventola, 2016).

Another barrier to vaccination is the patient's belief in the effectiveness of the influenza vaccine. With the CDC estimating 30%-60% effectiveness for the vaccine available for this 2017-2018 influenza season, many patients feel that there is no point in receiving the vaccine (CDC, 2017). Again, this barrier can be overcome through patient education on the recommendations for the vaccine, despite its overall effectiveness during any given season. Emphasis needs to be placed on the fact that although the vaccine is only 30-60% effective, healthy people are dying and no one truly knows how they will respond to the virus.

The final barrier to vaccination and the barrier that this quality improvement project focused on is clinic staff enthusiasm and compliance in screening for and recommending the vaccine. Overcoming this barrier was identified by clinic staff as one of the best ways to improve vaccination compliance within the clinic. The overall vaccination rate for the 2016-2017 influenza season at this clinic was 25%. This lack of screening and recommendation often stems from a lack of a standardized process, forgetfulness, and increased workflow (Pennant et al., 2015). Through a standardized vaccination screening and administration process, this barrier can be overcome (Ventola, 2016).

Purpose

The purpose of this quality improvement project was to improve the process of vaccination administration and to increase vaccination rates at a large academic medical center in Kentucky. By implementing a vaccination screening program beginning October 2017, vaccination rates were expected to increase by March 2018. Specific aims of this study were:

1. Evaluate the impact of implementing a vaccination screening program on vaccination rates.

GOAL: Increase vaccination rates at this clinic to 60% by March 2018.

2. Evaluate the impact of a team based practice improvement process to increase vaccination documentation.

GOAL: Increase documentation of outside receipt of vaccine or vaccination refusal for this clinic to 60% by March 2018.

Methods

Context

This study implemented a pre-test post-test design to evaluate the impact of a process change intervention on vaccination status.

Setting

This study took place at a large academic medical center in Kentucky. This clinic is one of seventeen clinics in association with this academic center and with approximately thirty providers, aims to serve a population with diverse needs. IRB approval was obtained prior to initiation of this study.

Sample

Participants for this study were selected from family medicine patients at this clinic. All patients were included as participants regardless of gender, age, vaccination status, or allergies. There was no exclusion of patients based on eligibility for the vaccine or if they were seen at the clinic during the time period of this study. The list of patients with documented influenza vaccination was obtained via the clinic's electronic medical record. This data was obtained from monthly chart audits of all patients registered as part of the family medicine clinic. The compliance rate was obtained by dividing the patients who received the vaccine by all patients in the family medicine clinic x 100. There was no incentive for participants to take part in this research study.

Interventions

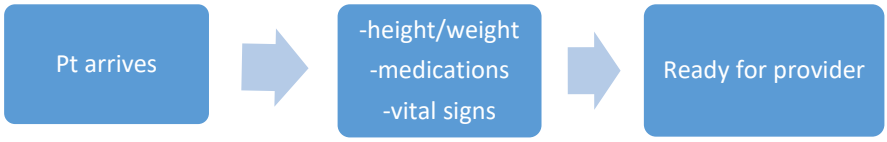
This study was conducted in four phases. Using the PDSA model as a guide, focus groups were held with clinic staff. The PDSA model is an improvement model that consists of planning, doing, studying, and then acting on the results (Institute for Healthcare Improvement, 2018). Chart audits were done monthly and changes were made based on feedback from clinic staff and vaccination rates.

The team involved in the implementation of this quality improvement project included all physicians, nurse practitioners, nurses, and CSTs working at this clinic. Clinical Services Technicians (CSTs) are a part of the healthcare team at this clinic and are responsible for the administration of vaccinations. A go-see was completed with CSTs from the red, purple, and green teams in September 2017 to assess the current vaccination process at the clinic. A go-see was an observation day to assess the CSTs normal workflow. CSTs in this clinic are divided into

teams which allow for even distribution between providers. A go-see included observing multiple CSTs as they checked the patient in and assessing their process during an entire shift. After this original go-see, a current process map was created (See Figure 1). Areas for improvement were then identified as a group and a plan for the first PDSA was made.

Figure 1

Current Process Flow



Baseline/Current State

There was no standardized process of vaccination screening at this clinic prior to this intervention. After calling the patient from the lobby, CSTs would obtain chief complaint, height, weight, vital signs, allergies, and an accurate medication list. Prior to implementation of this standardized process, immunization screening was only done if there was time and/or if the CST remembered.

Prior to the start of this quality improvement project, CSTs had no common process for immunization screenings and were screening based on personal preference and time per patient. This information was obtained via word of mouth from CSTs on the green, red, and purple teams at this clinic. There was not common knowledge regarding documentation of outside receipt of influenza vaccination or vaccine refusal.

PDSA Cycle 1

A meeting was then held in September 2017 with CSTs from the green team and a new process flow map was developed after identifying areas for improvement. The green team was chosen initially to test this intervention on a small scale prior to spreading it to the entire clinic until the process was perfected. Starting on a small scale prior to initiation to the entire clinic allowed for a changes to be made as barriers were identified. This new process flow map was developed and included a clear process for vaccination screening and administration agreed upon by both CSTs and providers on the green team. The CSTs would screen for vaccination status immediately prior to leaving the room during the patient encounter. A follow-up was then done weekly to assess for recommendations for improvements. A second go-see was done in October 2017 with the green team CSTs to assess flow and compliance.

PDSA Cycle 2

The process was evaluated through monthly chart audits of immunization status for the clinic and a process meeting with the CSTs. During the go-see in October 2017, a limitation to documentation was identified. CSTs were not able to document refusal of vaccination in the immunization record; only providers had this capability. This was then brought up with the information technology department, but they were not able to resolve the problem during the time frame of this study. The information technology department is currently in the process of working on a way for CSTs to document refusal of the vaccination. A new process flow map was then created, which included communication between CSTs and providers in documentation of refusal of the vaccine. This communication was done via a face to face transaction. The provider when then document this refusal in their note. Utilizing a new PDSA cycle, this new process flow was rolled out on the green team on October 31, 2017.

Using this new process, CSTs at this clinic assessed immunization status at the end of their patient interaction, prior to provider evaluation of the patient. This new standardized protocol then allowed for higher compliance of immunization screening and ability for CSTs to vaccinate the patient prior to provider evaluation. Data on vaccination rates were then collected via chart audits from November 1, 2017 to November 30, 2017.

PDSA Cycle 3

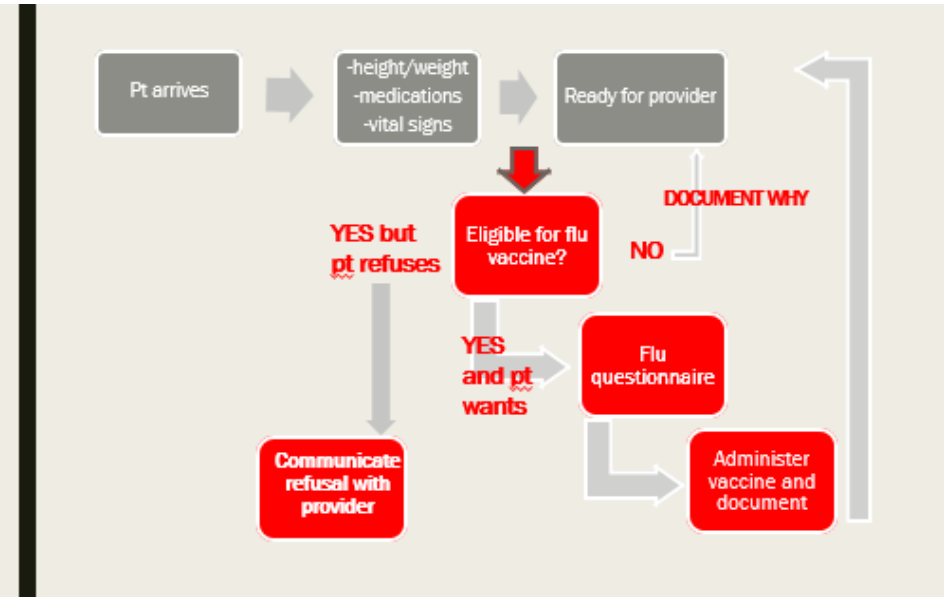
After the chart audit in November 2017, a new process flow map was developed based on feedback from the CSTs regarding a barrier to documentation of outside receipt of the influenza vaccination. A new process was developed to address this barrier to documentation. CSTs would document this outside receipt of the vaccination while they were still in the room with the patient to ensure completion, rather than waiting until they had left the room or solely communicating this to the provider. This would be documented in the immunization chart in the exact same spot as before, but they would click a box detailing "document without ordering." This would then allow for CSTs to document where and when a patient received the vaccine outside of this facility. Another chart audit was then obtained from December 1, 2017 to December 31, 2017, assessing for influenza vaccination compliance.

This final process flow map was then ready to be distributed to the entire clinic on January 24, 2018 (See Figure 2). The map was distributed to the entire clinic via an educational meeting and PowerPoint presentation describing the process flow and assessing for potential barriers and areas for improvement. No potential barriers or areas for improvement were identified during this meeting. A focus group discussion was held with the CSTs to discuss the process. It was agreed upon by the entire family medicine team to implement this process and

then continue with regular chart audits to assess the effectiveness of this process. Chart audits were then conducted monthly on vaccination rates until February 28, 2018.

Figure 2

New Process Flow



Measures (see Table 1): The measures for this study were:

1. Demographics: Age in years, gender, ethnicity, and vaccination status of patients were obtained from the patient charts
2. Vaccination rates: Vaccination rates were based on clinic staff documentation of providing a vaccination to patients within the specified time. There was only one allotted spot for immunization documentation in the electronic medical record. Individuals receiving the vaccination were coded as '1' and those not receiving the vaccination were coded as '0'. A ratio of those receiving vaccinations were calculated by dividing the number of those who received vaccinations over the eligible population times 100.

Table 1.

Study Measures

Measures	Description	Level of Measurement	Analysis	Data Source
Age	Age in years	Interval/Ratio	Means(SD), t-tests	Medical Records
Gender	Male vs Female	Nominal	Frequencies (%), Chi-Square	Medical Records
Ethnicity	White, Black, Hispanic, Indian, Native American, Mixed Race, Middle Easter, Asian, Other	Nominal	Frequencies (%), Chi-Square	Medical Records
Active Problem	Diagnosis made by primary care provider	Nominal	Frequencies (%), Chi-Square	Medical Records
Vaccination Rates	Number who received vaccinations/number eligible X 100	Interval/ratio	Independent sample t-test	Medical Records

Analysis

Vaccination rates at this clinic were obtained from monthly chart audits utilizing the electronic medical record. Rates were described in percentages based on the number of patients established in the family medicine clinic vs the number of patients whose current influenza immunization status was documented. This study was not able to discriminate between who was eligible for the influenza vaccination vs who was not eligible during these chart audits. This uncontrollable data included immunocompromised patients and patients with allergies to the vaccine who would have a contraindication to the vaccine.

Results

PDSA Cycle 1

Continuous cycles of change were completed to improve vaccination rates. New cycles were initiated based on feedback from clinic staff and vaccination rates. Baseline data for this quality improvement project were obtained October 2017 after initiation of the standardized protocol on the green team. Beginning influenza vaccination rates at this clinic were 0.65%.

PDSA Cycle 2

During the go-see in the middle of October 2017, a limitation to documentation was identified. A second PDSA cycle was initiated, adding the verbal communication between CSTs and providers of patient refusal of the influenza vaccine. The new process flow map was rolled out to the green team on October 31, 2017. Data on vaccination rates were then collected from the green team via chart audits from November 1, 2017 to November 30, 2017. Vaccination rates at this time increased to 12.4%.

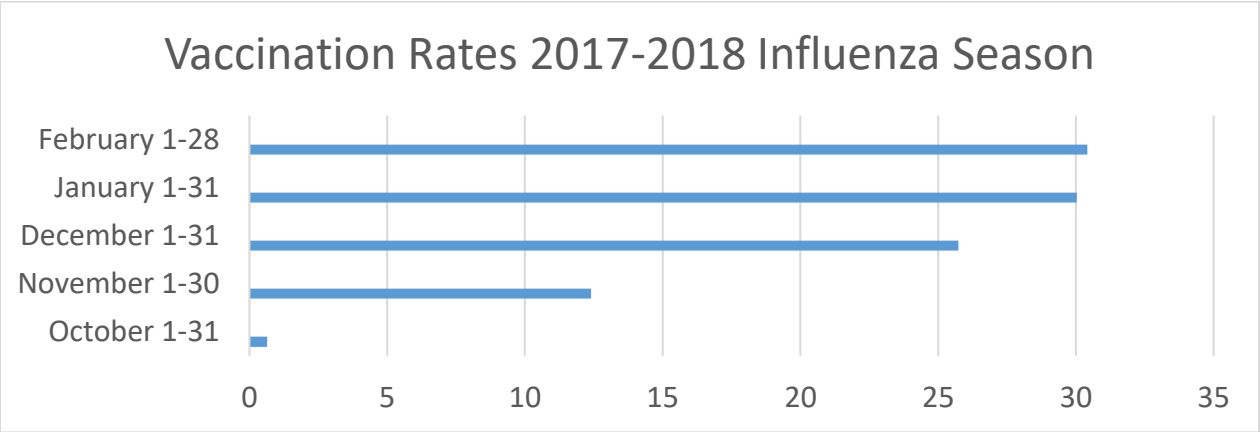
PDSA Cycle 3

Based on feedback obtained from the green team CSTs, a new process flow map was created in November 2017. This new flow map included documentation of outside receipt of the vaccine while the CST was still in the room with the patient. This outside receipt of the vaccine was charted in the same place that they would chart administration of the vaccine. A second chart audit was obtained from this same medical team from December 1, 2017 to December 31, 2017. Vaccination rates increased to 25.74% during this time.

The final process flow map was implemented in the entire clinic on January 23, 2018 and immunization rates for January 1, 2018 to January 31, 2018 were 30.03%. The first full month of entire clinic compliance with standardized process began February 1, 2018. Immunization rates for February 1, 2018 to February 28, 2018 were 30.42%. (See Figure 3) Immunization rates were then compared to the same time period from the previous year.

Figure 3

Immunization Rates



Discussion

Through a team based practice improvement process, overall vaccination rates increased in this primary care clinic. Comparison of the 2016-2017 to the 2017-2018 vaccination rates showed a 5.2% increase after initiation of this standardized protocol. This percentage was determined to be statistically significant through a chi-square test where the p-value <0.001. Creating a standardized screening and vaccination protocol was feasible and effective in increasing vaccination rates within this clinic.

Similar quality improvement projects have been published and also suggest an increase in vaccination rates based on changing clinic procedures and recommendations (Stone, 2002 and Parker et al, 2013). With a change in clinic procedures and recommendations, vaccination rates

increased as a result. In a meta-analysis of 108 articles related to prevention strategies, interventions such as organizational change of clinic procedures proved to be the best ways to increase vaccinations and screenings (Stone, 2002). In a quality improvement project by Parker et al. (2013), vaccination compliance was increased over a ten week period through the use of a screening questionnaire and process change for HPV vaccination. Vaccination rates can be increased significantly through process change utilizing an improvement model such as the PDSA and data evaluation.

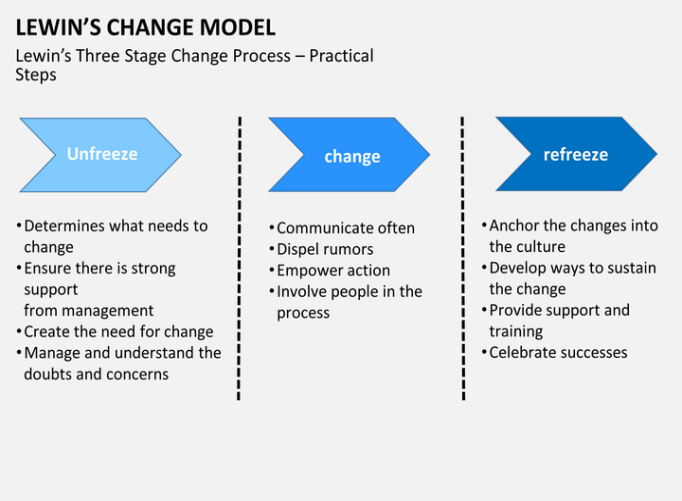
As a part of continuing quality improvement, this clinic has adopted this screening protocol as standard procedure and will continue to use this influenza vaccination screening process. This screening process can also be used in the future for other recommended vaccines. This process can be improved through the use of automatic electronic medical record reminders regarding overdue vaccinations in the patient's chart. These automated reminders are currently being developed by the information technology work group at this clinic.

Resistance to change was evident while observing CST compliance with the process change. The CSTs did not think that they would have the time to initiate this screening protocol into their busy schedule. Utilizing Prosci's Best Practices in Change Management (2018), this resistance to change was anticipated and we were proactive in managing the resistance. We used Lewin's change theory to combat this resistance and prepare CSTs for this change (Petiprin, 2016; See Figure 4). Education was provided to the CSTs on how long the process would take and how it could best be integrated into their busy schedules. Although there was major resistance in the beginning, this was overcome once CSTs realized this change could easily fit into their schedules. The CSTs were also involved in identifying barriers to the process and

changing the process as necessary. Although there was an attempt to overcome this barrier, resistance to change could have been a factor in the overall vaccination results.

Figure 4

Lewin's Change Theory



Limitations

A limitation identified in this study was the lack of ability of the CSTs to document vaccination refusal in the electronic medical record. Although the information technology work group is currently addressing this issue, they were not able to resolve it during the study. This inability to document refusal led to an overall decrease in the vaccination percentages, as the number of patients who refused should have been taken out of the number of patients eligible for the vaccination. There was no way to establish eligibility and account for this via vaccination rates in this study.

One factor that contributed to the increase in influenza vaccination during this study is the commonality of vaccination rates increasing as the influenza season progresses. It was expected that our beginning number would be low and that this number would rise throughout

the influenza season, despite intervention. Although this could have been a contributing factor, it is clear that intervention played a strong role in increasing these rates as there was a 5.2% increase in vaccination rates from the 2016-2017 influenza season.

Practice Recommendations

While there was a significant increase in vaccination rates from the 2016-2017 influenza season, overall clinic and enterprise goal of obtaining 60% vaccination rates for the 2017-2018 influenza season was not met during this study. It is projected that this goal could eventually be met by continually educating patients on the importance of the influenza vaccine and ensuring healthcare staff compliance with the vaccination process. Special influenza vaccine clinics could be held prior to the start of the influenza season at the clinic to increase initial rates. This special influenza vaccine clinic could be a way to reach patients who would not otherwise have a visit during the influenza season. Vaccination rates should still be monitored for the upcoming influenza seasons. This process can also be applied to all other vaccination rates. In order to apply this successfully to other vaccination rates, patient eligibility would have to be previously established in the electronic medical record.

It is also recommended that the inability to document refusal of the vaccine by CSTs be resolved by the information technology work group. If CSTs have the ability to document refusal of the vaccine, this will increase clinic compliance rates with vaccination percentages by taking away from those eligible for the vaccine. This increase in clinic compliance with vaccine administration will then aid in MACRA reimbursement for the entire academic medical center.

Practice Implications

This increase in influenza vaccination rates will improve quality of care within this clinic. Patients will have a decreased risk of becoming ill with the influenza virus, thus decreasing their risk for hospitalizations and death from the virus. This increase in vaccination rates will improve both patient quality of care and patient health outcomes.

Additionally, increasing the influenza vaccination rates will also help this clinic achieve Medicare Access and CHIP Reauthorization Act (MACRA) requirements for reimbursement. Through a standardized process of documentation, immunization data are able to be captured for MACRA reimbursement. With electronic medical record changes allowing for documentation of refusal of the vaccine, the clinic will be able to also use these refusals for MACRA reimbursement. This increase in vaccination rates will also allow this clinic to maintain their Patient Centered Medical Home (PCMH) accreditation.

Conclusion

The initiation of a standardized vaccination screening and administration protocol increased vaccination rates at this clinic. Through the continued use of this standardized vaccination process, influenza vaccination rates are expected to continue to rise for upcoming influenza seasons. Although this project was effective, there is more work to be done to continue to increase vaccination rates in the future and meet the goal of a 60% influenza vaccination rate at this clinic.

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